

## Chapter Comm 85

### SOIL AND SITE EVALUATIONS

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**Note:** Chapter H 65 as it existed on May 31, 1983 was repealed and a new Chapter ILHR 85 was created effective June 1, 1983. Chapter ILHR 85 was renumbered Chapter Comm 85 under s. 13.93 (2m) (b) 1., Stats., and corrections made under s. 13.93 (2m) (b) 7., Stats., Register, February, 1997, No. 494, **Chapter Comm 85 as it existed on June 30, 2000 was repealed and recreated, Register, April, 2000, No. 532, eff. 7-1-00.**

**Comm 85.01 Purpose.** The purpose of this chapter is to establish the minimum requirements for evaluating and reporting soil and site characteristics that may affect treatment or dispersal of wastewater, treated wastewater, final effluent or nonwater-carried human wastes.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.02 Scope.** Pursuant to s. 145.02, Stats., this chapter applies to all soil and site evaluations conducted relative to the treatment or dispersal of wastewater, treated wastewater, final effluent or nonwater-carried human wastes into soil.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.10 Qualifications. (1) SOIL EVALUATION.** A soil evaluation for treatment or dispersal of wastewater, treated wastewater, final effluent or nonwater-carried human wastes regulated by chs. Comm 83 and 91 shall be performed by an individual who is a certified soil tester.

**Note:** Section Comm 5.33 delineates the qualifications and certification procedures for certified soil testers.

**(2) SITE EVALUATION.** A site evaluation, relative to the installation of a POWTS treatment, holding or dispersal component location, or to determine land slope or setback distances to topographic or other site features shall be performed by a Wisconsin registered architect, professional engineer, designer of plumbing systems, designer of private sewage systems or land surveyor; a certified soil tester or POWTS inspector; or a licensed master plumber or master plumber-restricted service.

**(3) SOIL SATURATION DETERMINATIONS.** Soil saturation determinations may only be conducted and reported by an individual who is a certified soil tester.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.20 Soil evaluations. (1) GENERAL.** (a) Soil boring methods and procedures shall comply with this section.

(b) Maximum soil application rates shall be determined relative to the soil texture, structure and consistence for each soil horizon or layer.

**Note:** Section Comm 83.44 establishes maximum soil application rates and soil treatment capability for the design of POWTS treatment or dispersal components consisting in part of in situ soil.

**(2) NUMBER, TYPE AND DEPTH OF EVALUATIONS.** (a) *General.* The number, type, depth and location of soil profile evaluations shall be sufficient to delineate the area under investigation and to assure consistency of the data within that area.

(b) *Number and area.* 1. a. Except as provided in subpar. d. and subd. 2., a minimum of 3 soil profile evaluation excavations shall be used to delineate a site within which POWTS treatment or dispersal components consisting in part of in situ soil are to be located.

b. For estimated daily flows of 1,000 gallons per day or less, at least one soil profile evaluation excavation per treatment or dispersal site shall be constructed as a soil pit, and described in accordance with s. Comm 85.30 (1) (c).

c. For estimated daily flows greater than 1,000 gallons per day, at least three soil profile evaluations per treatment or dispersal site shall be constructed as soil pits, and described in accordance with s. Comm 85.30 (1) (c).

d. The department or governmental unit may require additional soil profile evaluation excavations to be constructed where soil variability considerations may not be adequately addressed. The department or governmental unit may specify that soil profile descriptions in accordance with s. Comm 85.30 (1) (c) be conducted for any additional soil profile evaluation excavations.

2. At least one soil pit or soil boring shall be used to establish soil suitability for a pit privy.

**Note:** Sections Comm 83.44 (3) and 91.12 (1) (b) 1. contain further information regarding privy siting and soil requirements.

(c) *Type.* 1. Soil profile evaluations used to determine soil application rates shall be conducted using soil pits.

2. Soil profile evaluations used to determine or identify soil horizon depths, soil color, soil texture, redoximorphic feature colors or depth to groundwater or bedrock shall be conducted using either soil pits or soil borings.

(d) *Depth.* Soil profile evaluations shall extend an adequate depth below the land surface to identify soil properties critical to soil treatment or dispersal of wastewater, treated wastewater, final effluent or nonwater-carried human waste.

**(3) EXCAVATION METHODS.** (a) *Soil profile excavations.* A soil profile excavation shall be of such size and construction to allow accurate determination of soil characteristics.

(b) *Soil borings.* 1. Soil borings shall be created by means of a soil bucket auger, soil probe, split-spoon sampler or Shelby tube having at least a 2 inch diameter.

2. A soil boring may not be created by means of a power auger.

(c) *Soil pits.* A soil pit shall be of adequate size, depth and construction to enable a person to safely enter and exit the pit and to complete a morphological soil profile description.

**Note:** Occupational safety and health administration regulations (29 CFR 1926, Subpart P) apply to certain types of excavations, and the persons entering such excavations need to be familiar with those regulations.

**(4) SOIL EVALUATION CONDITIONS.** (a) Soil color evaluations shall be performed on days when light conditions permit accurate color determinations.

(b) Frozen soil material shall be thawed prior to conducting evaluations for soil color, texture, structure and consistence.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.30 Soil profile description and interpretations. (1) GENERAL.** (a) A soil profile description shall be prepared for each soil profile excavation constructed.

(b) Soil profile descriptions shall be written in accordance with the descriptive procedures, terminology and interpretations found

in Chapter 3 of the *Soil Survey Manual*, USDA, October, 1993, except where modified by, or in conflict with, this chapter.

(c) A soil profile description to substantiate soil application rates shall include at least all of the following morphological information for each soil horizon or layer:

1. Thickness in inches or decimal feet.
2. Munsell soil color notation.
3. Soil mottle or redoximorphic feature color, abundance, size and contrast.
4. United States Department of Agriculture, USDA, soil textural class with rock fragment modifiers.
5. Soil structure grade, size and shape.
6. Soil consistence.
7. Root abundance and size.
8. Soil boundary.
9. Occurrence of saturated soil, groundwater, bedrock or disturbed soil.

(d) A soil profile description to substantiate soil characteristics other than for application rates shall include the information specified in par. (c) 1. to 4. and 9.

**(2) SOIL INTERPRETATIONS.** (a) Redoximorphic features or mottles shall be interpreted as zones of seasonal or periodic soil saturation or groundwater, except as provided under sub. (3).

(b) Unless determined otherwise under s. Comm 85.60, the highest elevation of seasonal soil saturation shall be the ground surface where redoximorphic features are present within 4 inches of the bottom of the A horizon.

**(3) SOIL COLOR PATTERN EXEMPTIONS.** (a) Without filing a report under s. Comm 85.60 (2), a certified soil tester may discount the following conditions, not limited by enumeration, as indicators of seasonally saturated soil:

1. Fossilized soil color patterns formed by historic periodic soil saturation.
2. A soil profile that has an abrupt textural change, consisting of silt loam or finer textures overlying at least 4 feet of unsaturated loamy sand or coarser textured soil and 24 inches or less of periodically saturated soil immediately above the coarser material.
3. Redoximorphic features orientated along old or decayed root channels.
4. Residual sandstone colors.
5. Unevenly weathered glacially deposited material, glacially deposited material naturally gray in color, or concretionary material in various stages of decomposition.
6. Deposits of lime.
7. Light colored silt or fine sand coatings on soil ped surfaces.

(b) Without filing a report under s. Comm 85.60 (2) for a specific site, the department may accept the results of soil saturation determinations or of the hydrograph procedure under s. Comm 85.60 previously conducted for areas adjacent to the site, provided that the soil profile descriptions and interpretations confirms that the soil and site conditions are similar for the specific site and the adjacent areas.

**(4) SOIL COLOR PATTERN REPORTS.** The certified soil tester shall report and describe any soil color pattern exemptions encountered.

**(5) DETERMINATION REQUESTS.** A certified soil tester may request a determination by the governmental unit or department staff on the significance of unusual soil color patterns as indicators of soil saturation that may not indicate saturated soil conditions that will interfere with wastewater treatment. The governmental unit or department may decline to make such determinations, and defer to the use of soil saturation determinations pursuant to s. Comm 85.60 or some other method to make a determination.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.40 Evaluation reports. (1) GENERAL.** A soil evaluation report shall be prepared and submitted to the governmental unit having jurisdiction upon the completion of the evaluation and associated report form.

**(2) SOIL REPORT CERTIFICATION AND FORMAT.** (a) *Soil evaluation reports.* Soil evaluation reports shall be prepared in a format specified by the department and this chapter.

**Note:** Soil evaluation report forms in an acceptable format are available from the Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162.

(b) *Certification.* 1. Except as provided in subd. 2., each page of a soil evaluation report shall bear:

- a. The original signature of the certified soil tester who collected the data;
- b. The certified soil tester's identification number; and
- c. The date the report is signed.

2. When more than one sheet of a soil evaluation report is bound together into one volume, only the title sheet shall:

- a. Be required to be signed, dated and bear the identification number of the certified soil tester who collected the data; and
- b. Clearly identify all other sheets comprising the bound volume.

**(3) REPORT CONTENTS.** (a) *Site report.* A site evaluation report shall include at least all of the following:

1. The site's legal description to within 40 acres.
2. The date the data was collected.
3. A legible and permanent site plan that:
  - a. Is presented on paper no smaller than 8 1/2 inches by 11 inches in size.
  - b. Is drawn to scale or fully dimensioned.
  - c. Shows the extent of the site evaluated for soil dispersal or treatment.
4. Location information for all points under investigation including structures, property lines and other encumbrances to the treatment or dispersal component placement on the site.
5. Pertinent elevation data, such as:
  - a. A reference to, and description of, a permanent vertical and horizontal reference point or bench mark from which all distances and elevations are delineated on the site plan;
  - b. The natural, undisturbed surface grade elevation for all soil profile excavations;
  - c. The percent and direction of land slope for the site under evaluation;
  - d. Ground surface contour lines at an interval appropriate for the conditions present;
  - e. The floodplain elevation, if established, and current surface elevation of any adjacent navigable waters or reservoir; and
  - f. The existing grade adjacent to the groundwater elevation observation pipe, the top of the observation pipe, and the bottom of the observation pipe.

(b) *Soil report.* A soil evaluation report shall include at least all of the following:

1. A site evaluation report pursuant to par. (a).
2. The date soil evaluations were conducted.
3. The site's legal description to within 40 acres.
4. Soil profile descriptions pursuant to s. Comm 85.30 for all soil profile evaluation excavations.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.50 Governmental unit review. (1) GENERAL.** (a) A governmental unit shall review all soil evaluation reports and site evaluation reports within 6 months of receipt.

(b) Upon completing the review of a soil evaluation report a governmental unit shall accept the report, reject the report, request additional information or clarification, or require verification under sub. (2).

(c) When a report is deemed acceptable, a governmental unit shall so indicate on the report and file the report for future reference.

(d) If the report is not acceptable, a governmental unit shall notify the submitter in writing and shall state the deficiencies or actions, or both, necessary to bring the report into compliance with this chapter or ch. Comm 83.

**(2) VERIFICATION.** (a) *Soil.* 1. The governmental unit or the department may require the property owner or the certified soil tester to provide soil pits in accordance with s. Comm 85.20 (3) for verification of soil profile evaluation data.

2. The certified soil tester who is responsible for the soil report shall be present at the site during the verification of soil profile evaluation data if so requested by the governmental unit or the department.

3. Soil verifications may not be conducted under adverse weather or light conditions that may lead to inaccurate results.

(b) *Site.* 1. The governmental unit or the department may require the property owner or certified individual who prepared the site report to provide assistance and equipment to verify site conditions.

2. The certified individual who is responsible for the site report shall be present at the site during the verification of site conditions if so requested by the governmental unit or department.

(c) *Report.* The governmental unit or the department shall complete a written report for each soil or site verification completed, and the results or findings of the report shall be filed with the soil and site evaluation report for future reference.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.

**Comm 85.60 Soil saturation determinations.**

**(1) GENERAL.** (a) *Optional documentation.* 1. A property owner, or their agent, may submit documentation to the department to prove that redoximorphic features, or other soil color patterns, at a particular site are not indicative of periodically saturated soil conditions or high groundwater elevation.

2. Documentation shall be in the form of an interpretative determination, soil saturation determination, or hydrograph procedure pursuant to this section.

(b) *Artificially controlled navigable waters.* If the groundwater elevation at a site is influenced by the artificial control of navigable waters by a recognized management entity, all of the following conditions shall be addressed:

1. If loamy sand or coarser soil textures prevail at a site, the groundwater elevation at the site shall be compared to the current and highest controlled navigable water elevation.

2. The highest normal groundwater elevation at such sites shall be the higher of either the observed elevation or an adjusted elevation based on the controlled water.

**(2) INTERPRETIVE DETERMINATIONS.** (a) A written report by a certified soil tester evaluating and interpreting redoximorphic soil features, or other soil color patterns, may be submitted to the department in lieu of high groundwater determination data. The written report shall conclusively demonstrate that the existing soil morphological features or color patterns are not indicative of current conditions of periodic soil saturation.

(b) The department shall make a determination on the validity of the data, results and conclusions set forth in the report.

(c) The written report shall include, but not limited to, all of the following information:

1. A soil evaluation report pursuant to s. Comm 85.40.
2. An interpretive review of the site including, but not limited to, all of the following:
  - a. Local hydrology.
  - b. An historical interpretation of the local geomorphology.
  - c. Soil disturbance and hydraulic modification.

d. The landscape position and local topography in the area under investigation.

3. Soil series and mapping units, if available, for the immediate area, as listed in the USDA soil survey.

4. Data, if any, from previous soil saturation determinations in similar soil conditions and landscape position.

5. Any written reports, comments or recommendations by the governmental unit or department staff.

**(3) SOIL SATURATION DETERMINATION.** (a) Actual elevations of soil saturation may be determined at specific sites in accordance with the soil saturation determination procedures in pars. (b) to (c).

(b) *Intent to determine soil saturation.* 1. The property owner, or his or her agent, shall notify the governmental unit and the department of the intent to conduct a soil saturation determination at least 15 business days prior to installing any groundwater elevation observation pipe.

2. The notification to conduct a soil saturation determination shall include:

a. Soil profile descriptions pursuant to s. Comm 85.30 in the area under investigation and the proposed number, depth, and location of the observation pipes; and

b. Written permission signed by the property owner for governmental unit and department personnel to enter upon the property under investigation during reasonable hours of the day to verify observation pipe installation or soil saturation determination results.

(c) *Precipitation.* 1. Precipitation data reported for soil saturation determination purposes shall include monthly totals for September through May, and daily totals for February through May.

2. Precipitation data totals under subd. 1. shall be from either the closest local station to the site where the observation pipe is installed, or the average from the 3 closest local stations to the site. If averaging is used, the totals under subd. 1. shall be submitted for all 3 stations.

(d) *Regional water tables.* 1. Where sites are subject to a broad, relatively uniform, regional water table, the fluctuation observed over a several year cycle shall be considered.

2. At such sites, and where free water levels are more than 5 feet below grade, determinations shall be made using the hydrograph procedures contained in sub. (4).

3. Areas affected by a regional water table shall be delineated by the department in consultation with the affected counties and the Wisconsin Geological and Natural History Survey.

(e) *Fine textured soil.* 1. The department may prohibit soil saturation determinations in fine textured soil with high matric potentials where determination results may be inconclusive.

2. In such cases, the department may approve alternative methods to address the direct determination of saturated or near saturated soil conditions not enumerated in this section.

(f) *Groundwater elevation observation pipe installation and construction.* 1. Number of observation pipes. a. At least 3 groundwater elevation observation pipes shall be installed to delineate the area under investigation.

b. The governmental unit or department may require more than 3 observation pipes to adequately evaluate potential soil saturation conditions.

2. Observation pipe depth. a. At the request of the department or governmental unit, at least one observation pipe shall be constructed to a depth of 15 feet below the ground surface to determine if high groundwater elevation conditions are due to a perched water table and the possible extent of the saturated zone.

b. Other observation pipes shall terminate at specific depths below grade that will serve to evaluate where shallow perched zones of soil saturation occur within the soil profile.

c. The governmental unit or department may designate specific observation pipe depths and locations based on soil and site

conditions, or experience in a particular geographic area or topographic position.

d. An observation pipe may not be less than 24 inches deep.

3. Observation pipe construction. The direct observation of soil saturation conditions shall be accomplished by means of observation pipes conforming to this subdivision and Figure 85.60-1.

a. The observation pipe shall be of a material meeting the standards in s. Comm 84.30 Table 84.30-1, except that lead pipe may not be used.

b. The inside diameter of an observation pipe may not be less than 2 inches or more than 4 inches nominal size.

c. The borehole diameter shall be 2 to 4 inches larger than the outside diameter of the observation pipe.

d. The top of the observation pipe shall terminate at least 18 inches above grade and be provided with a vented cap.

e. The bottom of the observation pipe shall terminate with a slotted, or screened pipe. The slots or screen shall extend 6 to 18 inches above the bottom of the pipe and be at least 4 inches below

the filter pack seal. The slots or screen shall not be hand cut and shall be designed to retain soil particles with a diameter of greater than 0.02 inch.

f. Except for the vented end cap, joints between lengths of pipe and fittings shall conform to s. Comm 84.40.

g. Finished grade around the observation pipe shall be sloped away from the observation pipe using soil material.

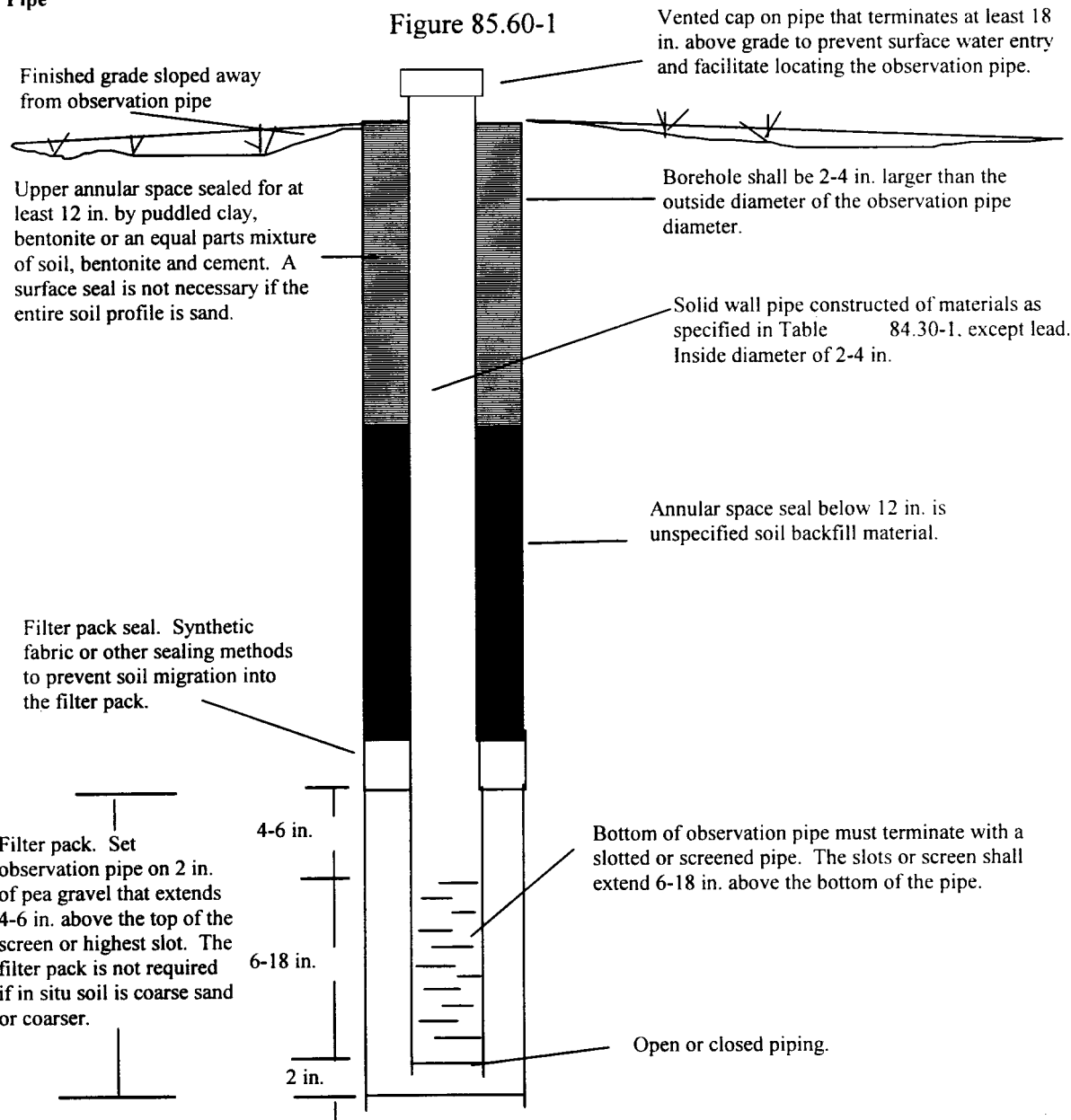
h. At a minimum, the upper 12 inches of annular space surrounding the observation pipe shall be sealed by puddled clay, bentonite, or an equal-parts mixture of soil, bentonite and cement. A surface seal may not be necessary if the entire soil profile is sand.

i. The annular space seal below 12 inches and to the top of the filter pack seal may be of unspecified soil material.

j. A filter pack seal shall be installed above the filter pack to prevent soil migration downward into the filter pack.

k. The observation pipe shall be set on at least 2 inches of pea gravel that extends 4 to 6 inches above the top of the screen or highest slot. The gravel filter pack is not necessary if the natural soil is coarse sand or coarser.

**Groundwater Elevation Observation Pipe**



(g) *Observations.* 1. Observation period. The observation period for soil saturation determinations shall begin on or before the appropriate date specified in Figure 85.60-2, and end June 1<sup>st</sup>.

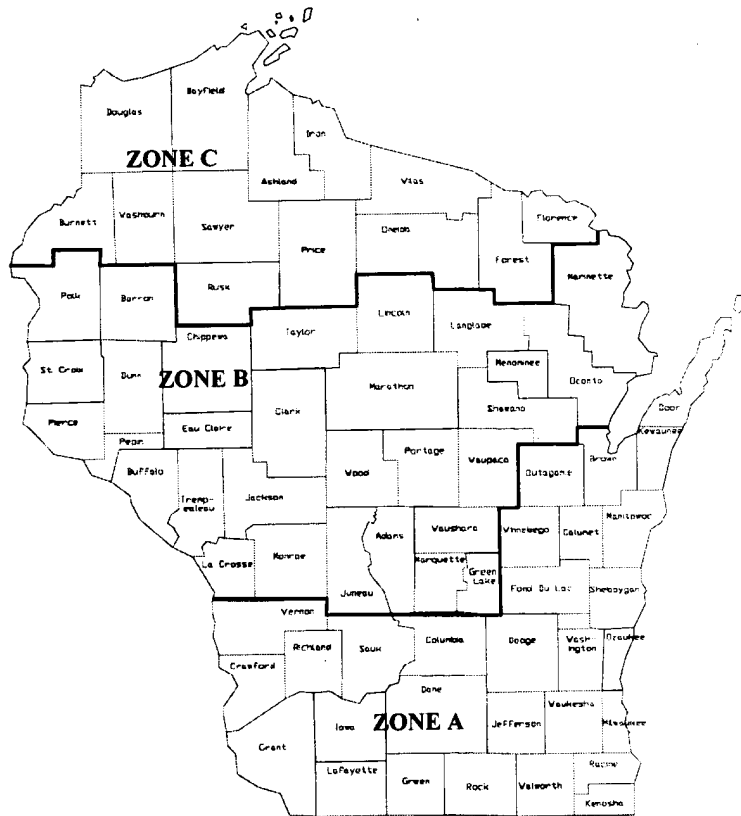
2. Alternate observation period. The department may approve an alternate observation period if the data presented conclusively demonstrates equivalency to conditions encountered during a normal spring observation period.

3. Minimum frequency. Observations shall be made on the first day of the observation period and at least every 7 days thereafter until the observation period is complete.

(h) *Conclusions.* 1. The highest level of soil saturation shall be considered to occur at the highest elevation of free water present in an observation pipe during a 7-day observation period.

2. The results of soil saturation determinations under this section shall be considered inconclusive if the precipitation totals under par. (b) do not equal or exceed:

- a. 8.5 inches from September 1<sup>st</sup> through the last day of February; and
- b. 7.6 inches from March 1<sup>st</sup> through May 31<sup>st</sup>.



**Figure 85.60-2  
Latest Date to Begin Spring Soil Saturation Monitoring**

Zone A	February 15
Zone B	March 1
Zone C	March 15

(i) *Reporting data.* 1. Within 60 days of the completion of the observations, 3 copies of the following data shall be submitted to the department for review:

- a. A soil and site evaluation report pursuant to s. Comm 85.40.
- b. Observation pipe installation, depth, location and elevation information.
- c. Precipitation data and name of any local station used.
- d. Observation dates.
- e. Current and any prior observation results.
- f. Any governmental unit observations or reports pertaining to the soil saturation determination observations, observation pipe construction or soil/site conditions.

2. Within 60 days of the completion of the observations, one copy of the data specified in subd. 1. shall be filed with the governmental unit having jurisdiction.

(j) *Report forms.* Soil saturation determination results shall be reported on forms specified by the department.

**Note:** Soil saturation determination report forms in an acceptable format are available from the Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162.

(k) *Failure to report.* Failure to file soil saturation determination results with the governmental unit and department within 60 days may disqualify the site from future soil saturation or interpretive determinations.

**(4) HYDROGRAPH PROCEDURE.** (a) 1. Where regional water table fluctuations are considered in deep sandy soil, the predicted high groundwater elevation shall be established using hydrograph documentation.

2. The highest groundwater elevation shall be determined by direct observation during the soil profile evaluation or by one of the hydrograph methods outlined in pars. (b) to (d), whichever is highest.

(b) 1. If there is less than 5 feet to free water below original grade, the procedures detailed in sub. (2) or (3) shall be used to determine the highest predicted groundwater elevation at the site.

2. If there is 5 feet or more to free water below original grade, the hydrograph procedure may be used to determine the highest predicted groundwater elevation at the site.

(c) Where the water table at the site is 5 to 10 feet below grade, the procedures of subds. 1. to 5. shall be followed:

1. A completed soil and site evaluation report pursuant to s. Comm 85.40 that confirms the elevation of free water, if observed, shall be prepared.

2. a. A slotted or screened groundwater elevation observation pipe shall be installed at the proposed system location to a depth of at least 12 inches below the free water elevation.

b. The observation pipe shall be installed and tested pursuant to sub. (3) (f) 3.

3. a. The water level in the observation pipe shall be recorded after completion of the observation pipe installation and 7 days later.

b. The highest of the 2 water levels shall be used to complete the hydrograph procedure.

4. The permanent USGS groundwater elevation well or wells as assigned by the governmental unit or department shall be read within 24 hours of establishing the actual free water elevation at the site.

**Note:** Soil evaluation report forms in an acceptable format are available from the Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162.

5. The hydrograph procedure shall be completed and the results shall be reported to the department in a format specified by the department.

(d) Where the water table at the site is 10 feet or greater below grade, the procedures of subds. 1. to 3. shall be followed.

1. A completed soil and site evaluation report pursuant to s. Comm 85.40 that confirms the elevation of free water, if observed, shall be prepared.

2. The permanent USGS groundwater elevation well or wells assigned to the project by the governmental unit or department

shall be read within 24 hours of the actual free water determination at the site.

3. The standard hydrograph procedure shall be completed and the results shall be reported to the department in a format specified by the department.

**Note:** Hydrograph soil saturation report forms in an acceptable format are available from the Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162.

**(5) SOIL SATURATION OBSERVATION PIPE REMOVAL.** The following requirements shall apply to all groundwater elevation observation pipes installed pursuant to this section:

(a) *Removal timeline.* Unless specifically approved by the governmental unit or department, all groundwater elevation observation pipes shall be removed within 60 days after the completion of soil saturation determination.

(b) *Contamination conduit.* Any groundwater elevation observation pipe found by the department or governmental unit to be acting as a conduit for groundwater contamination shall be ordered removed immediately.

**(6) VERIFICATION.** (a) *Verification.* 1. The governmental unit or department may request verification of soil saturation determinations pursuant to s. Comm 85.50 (2), and proper observation pipe installation pursuant to this section.

2. The governmental unit or the department may require any groundwater elevation observation pipe deemed by the governmental unit or the department to be in poor contact with the surrounding soil to be reinstalled pursuant to this section.

(b) *On-site visits.* 1. The governmental unit or department may visit sites during soil saturation determination periods or at other reasonable times to determine the accuracy of data.

2. A written record of on-site visits in subd. 1. shall be maintained by the agency conducting the visits.

**History:** Cr. Register, April, 2000, No. 532, eff. 7-1-00.